

REMARKS

A new claim 14 is presented which, as indicated below, recites a combination of features that especially commend it to the examiner's favorable consideration. And applicants believe that the other claims presented also merit favorable consideration.

In the final Office Action, claims 1, 3, 5 and 6 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Yuka '329, '870, '192, or '609 in view of Taylor (US 4,292,105). Claims 1, 3, 5 and 6 are rejected under 35 U.S.C. §103 (a) as being unpatentable over the Yuka references in view of Benzinger (US 3,617,613). Claims 1, 3, 5 and 6 are rejected under 35 U.S.C. §103 (a) as being unpatentable over the Yuka references in view of Casadevall (US 3,960,626). Claims 6-8 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Franz et al. (US 3,922,459) in view of the Yuka references. Claims 1, 3 and 5-8 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Burke (US 3,619,324) in view of the Yuka references.

The rejections are respectfully traversed.

While the Yuka references ('329, '870, '609, '092) disclose a sulfomethylated condensation polymer, they do not disclose that the resin should be advanced to the B-stage of curing.

The final Office Action further states at page 5 that Taylor discloses that the polymerization of the thermosetting polymer therein discussed should be advanced to the B-stage.

But the Office Action provides no rationale for the proposition that the teachings of

the Yuka references should be combined with that of the Taylor reference (or the other references relied upon) in the manner required by the applicant's claims.

Independent claim 1 is very precise in its phraseology. It specifies that a material to be molded comprises a porous material in which a phenolic resin which is a condensating polymer of a phenolic compound and an aldehyde and/or aldehyde donor is impregnated. The phenolic resin is at least partially sulfomethylated and/or sulfimethylated at a time when the phenolic resin is at the B-stage to enhance moldability, storage life, and heat resistance.

That concept is not found in the documents relied upon.

The Yuka references disclose a resin that is sulfomethylated, but say nothing of the advantages of advancing a resin to the B-stage of curing.

The Taylor reference discloses advancing a polymer to the B-stage but contains no suggestion that there is any special advantage to doing so in a case where the resin is at least partially sulfomethylated and/or sulfimethylated.

The Casadevall patent (US 3,960,626) discloses fibers in which high temperature phenolic resin is impregnated and partially cured to the so-called "B-stage" to facilitate handling. While this reference discloses pre-impregnated fibers, it has not disclose porous material to be molded as in the present invention and further does not disclose adding an aldehyde and/or aldehyde donor together with a phenolic resin. In the present invention, aldehyde and/or aldehyde donor is(are) added in the phenolic resin so that after molding phenolic resin at B-stage in the molded material is completely cured to have good dimensional stability and heat resistance (see page 19 line 32 to page 20 line 1). It should be noted that this reference does not concern "molding."

The Benzinger patent (US 3,617,613) discloses a punchable printed circuit board base laminate formed by laminating thermosetting resin impregnated woven glass fiber sheet. The thermosetting resin is epoxy resin (column 2 line 68 to 69); no phenolic resin is disclosed as thermosetting resin impregnated in woven glass fiber sheet.

The Franz reference (US 3,922,459) discloses a formed substrate comprising a web of fibers. The substrate is coated with a coating of a condensation polymer of formaldehyde with cresol or phenol. The patent discloses a formed substrate in which phenol formaldehyde and cresol formaldehyde resin solutions are impregnated. This reference does not disclose that the resin is at B-stage.

The Burke reference (US 3,619,342) discloses a corrugated cellulosic sheet member containing aminoplast containing phenol-aldehyde resin system or modified phenol-aldehyde resin system. The phenol-aldehyde resins are not at B-stage.

There is no basis--except the applicant's disclosure--for recognizing the synergistic effect that results from combining both of those features in accordance with the present invention.

Importance of Sulfomethylation or Sulfimethylation

The number of known resins is truly huge. A certain subset of resins, namely those at least partially sulfomethylated and/or sulfimethylated, benefit in a heretofore unforeseen way by advancing the resin to the B-stage in accordance with the present invention. The same synergism would certainly not result from advancing every resin, even though not sulfomethylated and/or sulfimethylated, to the B-stage.

We refer again to the Stability Test submitted with the amendment mailed September

5, 2003, as Exhibit A. That shows that advancing a resin to the B-stage is insufficient to obtain the results of the invention. If the resin is not sulfomethylated or sulfimethylated, stability is greatly compromised. In the Stability Test previously submitted, Resin E of the present invention, sulfimethylated, has excellent stability and retains its adhesiveness after 180 days of storage while Resin F, not sulfimethylated, is unstable and loses adhesiveness after a mere 30 days of storage. Note that both Resin E and Resin F are advanced to B-stage.

By putting the precondensation polymer of a correctly chosen resin at B-stage, the resin in the porous material has good stability and the molding time is shortened. Thus, in Example 1 (specification pages 30-32), the press temperature was 180°C, press pressure was 3 kg/cm², and press time was 0.5 minutes.

Importance of Advancing Resin to B-Stage

We refer also to Exhibit A to the amendment dated March 24, 2004, which describes a Sticking Test in which the identical resin E of the invention was employed to make sheets A and B, respectively. Resin E was sulfimethylated. In the case of sheet sample A, the resin is advanced to the B-stage. In the case of sheet sample B, the resin is in the A-stage. The superior results achieved in accordance with the invention are apparent from Table 1 (Roll sticking test) and Table 2 (Lamination test).

As Exhibit A shows, the sheet in which the resin at B-stage is impregnated has no stickiness so that the sheet can be rewound in a roll for compact storage, and even after lengthy storage, the sheet can be easily pulled out from the roll when the sheet is molded, while the sheet in which the resin at A-stage is impregnated is sticky so that the sheet is difficult to pull out from the roll and after lengthy storage, the sheet cannot be pulled out.

Further, the sheet in which the resin at B-stage is impregnated does not stick to the mold face when the sheet is press-molded so that the surface of the sheet has no damage after press-molding and a product of commercial value is ensured.

Thus, the sulfomethylation and/or sulfimethylation of the resin is insufficient to obtain the results of the invention. If the resin is not advanced to the B-stage, quality is severely compromised.

In order to achieve the objects of the invention, (1) the resin must be put at B-stage, and (2) the resin must be at least partially sulfomethylated and/or sulfimethylated.

Those results are not predictable from any teaching in the documents relied upon. The applicant's own disclosure is the only basis for predicting the unexpected results provided by the present invention.

New claim 14 is directed to a material to be molded shaped as a base sheet, an adhesive, and a cured material laminated on the base sheet as a surface layer by means including the adhesive. The cured material comprises a porous material in which a phenolic resin is impregnated. The phenolic resin comprises a condensating polymer of a phenolic compound and an aldehyde and/or aldehyde donor produced using ammonia and/or amine. The phenolic resin is at least partially sulfomethylated and/or sulfimethylated at a time when said phenolic resin is at B-stage. The invention enhances moldability, storage life, and heat resistance.

Claim 14 recites the features of the rejected claims in combination. That combination is not found in the other claims and is patentable for all of the reasons set out above. It is believed that, in accordance with the examiner's analysis as set forth in the final Office

action, a rejection of claim 14 would require reliance on one of the Yuca patents 329, '870, '192, or '609, plus Taylor '105, Benzinger '613, Casadevall '626, Franz '549, and Burke '342. That is, the teachings of no less than six patents would have to be combined to support a rejection of claim 14.

While there is no fixed limit to the number of different documents whose teachings can be combined to support an argument of obviousness, the greater the number of documents that are invoked in support of a rejection of a claim, the greater becomes the appearance that the applicant's own disclosure is being used simply as a list of features to be found wherever possible in prior art, without regard to a suggestion in those documents that their teachings should be combined in the manner taught by the applicant. Careful consideration of claim 14 is therefore respectfully requested.

The withdrawn claims may be cancelled by examiner's amendment when the application is otherwise in condition for allowance. Such cancellation is without prejudice to applicant's right to file a divisional application directed to their subject matter.

For the reasons stated, allowance of the application is respectfully requested.

Respectfully submitter,
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